Wireless Control Transmitter

Technical Field

The present invention relates to a wireless control transmitter, and a wireless control transmitter having a steering wheel conveniently operational for any of left-handed and right-handed users.

Background of The Art

In a wireless control transmitter for controlling a wireless control type toy vehicle and the like, two types of control section exist, that is a stick type and a wheel type. The stick type is a wireless control transmitter for controlling with a stick both control signal generating resistance of a steering and control signal generating resistance of speed. In a wireless control transmitter with usual transmission signal of two channels, two sticks are arranged both right and left, the shapes of the sticks are same, and difference of the sticks on the right and left is small.

While, the wheel type is a wireless control transmitter for controlling the control signal generating resistance of the steering with a wheel of miniature of a steering wheel and for controlling the control signal generating resistance of the speed with a throttle trigger. Control is convenient because the steering is controlled in rotational motion and rotational movements of a vehicle and the wheel are consistent.

However, means for controlling is the wheel and the throttle trigger, which

are completely different in shape and arrangement in the wireless control transmitter is asymmetry. Usually, the throttle trigger is arranged to be controlled by a left hand and the wheel is arranged to be operated by a right hand. In this case, the arrangement is conceived for a right-handed user, which is not always convenient for a left-handed user to operate.

The shapes of the controlling means are also completely different, since simple exchange of both functions, such as electrical control of the wheel velocity, control of the steering by the throttle trigger and the like, may not overcome the problem at all.

Manufacturing a wireless control transmitter only for a left-handed user is too costly for manufacturers of the wireless control transmitter so that manufacturing has been substantially difficult, because the number of manufactured products is small.

In Japanese Laid-Open Patent Publication H10-314463, a main body provided with the steering wheel and a grip are attachable and detachable and the directions of the steering wheel and the grip are variable. Size of the structure, however, increases by accompanying a replaceable contact section, which causes a problem of wearing.

Therefore, an object of the present invention is to provide a wireless control transmitter which is compact and easy to operate for any of a right-handed user and a left-handed user.

Disclosure of The Invention

In order to solve the aforementioned problems, a wireless control transmitter according to the present invention comprises a grip to be grasped by a

dominant hand of a user, a throttle trigger lever slidably protruding along a lower surface of a controller provided at a head portion of this grip and for controlling forward and backward movements of the controlled body, and a steering wheel arranged on the upper surface of an end portion of the controller and for controlling right and left turns of the controlled body. This steering wheel can be fixed by tilting its axial direction toward a particular direction with respect to the controller.

A back surface of the steering wheel is provided with a position fixing part, and cylindrical portions are protruded on the upper and lower ends of this position fixing part. The end part of this cylindrical portion is provided with a partially-toothed-gear edge comprising a partially-toothed-gear and the vicinity of joint of the other cylindrical portion with the position fixing part is provided with a cylindrical end part comprising a partially-toothed-gear. A controller is provided with two circular pores. When this position fixing part moves so that inner teeth of both inner circumferences of these circular pores and the partially-toothed-gear edge are engaged, the position fixing part is fixed on the controller, and when the position fixing part moves to a position such that the cylindrical end parts are mounted in the circular pores, the position fixing part becomes slidable to the controller.

A guiding axis is protruded parallel to a cylinder from the position fixing part in the hollow inner part of the partially-toothed-gear edge, and a spring is arranged on the guiding axis for integration, whereby this spring surpresses the controller to engage the partially-toothed-gear edge into the circular pores.

Brief Description of the Drawings

Figure 1 is an overall view showing an example of a wireless control

transmitter in accordance with the present invention.

Figure 2 (a) is a top view showing an example of a wireless control transmitter in accordance with the present invention, wherein a steering wheel is tilted to the right and (b) is a top view thereof, and is tilted to the left,

Figure 3 (a) is a perspective view of an engaging part of a steering wheel showing an example of a wireless control transmitter in accordance with the present invention, (b) is a side view thereof, (c) is a top view thereof in the engaged condition and (d) is a top view thereof in the fitted condition,

Figure 4 (a) is a back view of a steering wheel and a position fixing part showing an example of a wireless control transmitter in accordance with the present invention, (b) is a front view of the position fixing part thereof, and (c) is a perspective view of combination thereof.

Best Mode for Working The Invention

Other details, advantages, and features of the present invention are described in following embodiments with reference to accompanied drawings.

As shown in Figure 1, in a wireless control transmitter in accordance with the present invention, a main body 2 of the wireless control transmitter is joined with a grip 4 and a controller 6 at an upper part of this grip 4. An upper surface of an end of a grip joining side of the controller 6 is provided with a steering wheel 8 in a rotatable and tiltable manner. While, a throttle trigger lever 10 is slidably provided in the vicinity of the grip 4 on a lower surface of the controller 6.

The steering wheel 8 is capable of tilting in the right and left as shown in Figure 2 (a) and (b). This steering wheel 8 is needed to be structured so as to rotate around a center axis of the steering wheel 8 for performing intrinsic function

thereof and further to tilt with reference to an axis which is perpendicular to the center axis and also parallel to a rotational plane of the steering wheel 8, whereby the steering wheel 8 is capable of tilting.

A rotation mechanism of a direction of an tilting axis is described using Figure 3 and a steering rotation mechanism centered on a steering trim is described in reference to Figure 4.

Figure 3 (a) is a perspective view of an engaging part of a steering wheel showing an example of a wireless control transmitter in accordance with the present invention, (b) is a side view thereof, (c) is a top view thereof in the engaged condition and (d) is a top view thereof in the fitted condition.

A position fixing part 12 is arranged in a horizontal direction of the backside of the steering wheel 8. The steering rotation mechanism is incorporated in the inner part of the position fixing part 12. An upper pillar portion 14 is protruded upwardly on a center part of an upper surface of the position fixing part 12, a lower pillar portion 16 is protruded downwardly on a center part of a lower surface of the position fixing part 12. The upper end of this upper pillar portion 14 is a pillar and further teeth 20 are provided in a partially-toothed-gear shape around the pillar in a vicinity of a joint with the position fixing part 12. While, teeth 22 are provided in a partially-toothed-gear shape at a lower end of the lower pillar portion 16 and vicinity of the joint with the position fixing part 12 is formed into cylinder shape.

The steering wheel 8 is arranged by inserting the position fixing part 12 into a position fixing pore 25 formed at a top of the controller 6. An upper part and a lower part of the position fixing pore 25 are provided with inner toothed pores 27 and 29 toothed with inner teeth 26 and 27, respectively. When the position fixing part 12 is inserted into the position fixing pore 25, the pillar portions 14, and 22 are

inserted into the inner toothed pores 27 and 29, respectively.

As shown in Figure 3 (b), the lower pillar portion 16 is hollow, and a spring axis 24 is protruded along the inside of the lower pillar portion 16 from the lower surface of the position fixing part 12. When the lower pillar portion 16 is inserted into the inner toothed pore 29, a spring 18 is arranged between an outer plate 34 of the controller 6 and the spring axis 24. This spring 18 is longer than distance between the outer plate 34 and the spring axis 24 to press the outer plate 34 and the spring axis 24, whereby a whole of the steering wheel 8 is constituted to be always pressed upwardly to the position fixing pre 25.

Namely, as shown in Figure 3 (c), the steering wheel 8 and the position fixing part 12 are arranged to be pressed toward the upper part of the controller 6, that is upper right in the drawing. Then, the teeth 20 toothed in the upper pillar portion 14 and the inner teeth 26 in the side of the inner toothed pore 27 are engaged and the teeth 22 toothed in the lower pillar portion 16 and the inner teeth 32 in the side of the inner toothed pore 29 are engaged. Therefore, when the pillar portion is an axis, the steering wheel 8 is fixed and unable to rotate.

While, as shown in Figure 3 (d), when pressing the steering wheel 8 toward the lower side of the controller 6, that is lower left in the drawing, by an external force, the spring 18 decreases in length and the steering wheel 8 and each pillar portion move toward lower left side. Therefore, the engagement of the teeth 20 toothed in the upper pillar portion 14 and the inner teeth 26 of the side of the inner toothed pore 27 is released so that the upper pillar portion 14 is inserted into the inner teeth 26 and also engagement of the teeth 22 toothed in the lower pillar portion 16 and the inner teeth 32 of the side of the inner toothed pore 29 is released so that the lower pillar portion 16 is inserted into the inner teeth 32. Thus, in this

time the steering wheel 8 is constituted in a rotatable manner around an axis of the pillar portion. Namely, as shown in Figure 2 (a) and (b), the steering wheel 8 is capable to tilting in the right and left without interfering with a rotation of a steering rotation mechanism, in accordance with a dominant hand of the user for the controller 6.

In reference to Figure 4, a steering rotation mechanism centered on a steering wheel rotational axis is described. Figure 4 shows (a) a back surface of the steering wheel 8, (b) a layout plan of the position fixing part 12 and (c) a perspective view combining the steering wheel 8 and the position fixing part 12.

As shown in Figure 4 (a), in the rotation mechanism of this steering wheel 8, the position fixing part 12 and the steering wheel 8 are installed in a rotatable manner at a steering trim 53 as the axis.

A left screw tubular pillar 48 and a right screw tubular pillar 50 are protruded on a horizontal line passing through a wheel axis on the back surface of the steering wheel 8, respectively. When the steering wheel 8 is combined with the position fixing part 12, these screw tubular pillars are inserted into a beans-type opening 62 for left screw tubular pillar and a beans-type opening 64 for right screw tubular pillar provided in the right and left of the position fixing part 12, where a rotational angle of the steering wheel 8 is defined by length of the opening 62 for the left screw tubular pillar and opening 64 for the right screw tubular pillar.

An upper fixing plate 44 is arranged in an uppermost part of a rotational axis in the back surface of the steering wheel 8, and a lower fixing plate 46 is also arranged directly under the rotational axis in the back surface.

A pivot shaft 56 is protruded in a direction of the steering wheel 8 at the center of the bottom of the position fixing part 12. A pivot plate 54 with an axis

hole 57 at its end is arranged on this pivot shaft 56 in a rotatable manner around the pivot shaft 56. The middle part of the whole length of the pivot plate 54 is curved in a semicircle shape, and a terminal part of the pivot plate 54 opposite to the axis hole 57 with reference to the semicircular part is provided with a pivot plate spring fixture 68. A spring fixture 66 of the position fixing part side is arranged on an upper surface of the position fixing part 12 in relation to the pivot plate spring fixture 68. A spring 70 for pivot plate is arranged between the pivot plate spring fixture 68 and the spring fixture 66 of the position fixing part side.

The steering wheel 8 and the position fixing part 12 are arranged in this manner, thereby when the steering wheel 8 is rotated in a clockwise direction on the drawing in Figure 4 (a), the upper fixing plate 44 presses an upper fixing plate joint position 60 of the upper part of the pivot plate 54. Therefore, the pivot plate spring fixture 68 and the spring fixture 66 of the position fixing part side are spaced and the spring 70 for pivot plate is extended. Force toward a neutral direction acts on the pivot plate 54 by resilience of the spring 70 for pivot plate.

While, when the steering wheel 8 is rotated counterclockwise on the drawing in Figure 4 (a), the lower fixing plate 46 presses a lower fixing plate joint position 58 of the lower part of the pivot plate 54. Similarly, the pivot plate spring fixture 68 and the spring fixture 66 of position fixing part side are spaced and the spring 70 for pivot plate is extended. Therefore, the force toward the neutral direction acts on the pivot plate 54 by resilience of the spring 70 for the pivot plate.

Namely, even if the steering wheel 8 is rotated in any direction, the force acts in the neutral direction that the steering wheel 8 returns.

The steering wheel 8 is constituted as described above, thereby the steering wheel 8 is arranged in a rotatable manner around the axis direction without

being interfered by the rotation mechanism of a tilting axis direction. Namely, even if the steering wheel 8 is tilted in a direction of either right or left with reference to the controller 6 in accordance with a dominant hand of a user, steering control function is not affected.

Consequently, because of the above-mentioned movement, the wheel type wireless control transmitter is easy to operate for both a right-handed user and a left-handed user.

For instance, no matter what a tilting direction due to a dominant hand is, operationality is equal and a user can use in no way inferior. Obviously, wheel operation with a hand convenient for a user is enabled regardless of innate dominant hand.

The steering wheel is also capable of returning to a neutral position of a wheel by using only one spring, whereby malfunction during operation such as lock of the steering wheel in the rotating condition can be prevented from occurring.

Manufacturing the wheel type wireless control transmitter for purpose of both a right-handed and left-handed users can eliminate the need for separately manufacturing wheel type wireless control transmitters for each dominant hand.